2013 USER MANUAL

G. SOFTWARES / DATAS ACQUISITION

G SOFTWARES / DATAS ACQUISITION

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G.1 DATAS ACQUISITION

G.1.1 PRESENTATION

The vehicle is supplied with an USB Stick containing the following software applications:

- TOOLSET v3.x
  - Check live parameters (engine, Gearbox, chassis…etc)
  - Downloading datas recorded in the datalogger
  - Configure your dashboard

- TOOLBOX 6.2
  - Data acquisition analysis

All these softwares are compatible with Windows XP, Vista and 7.0

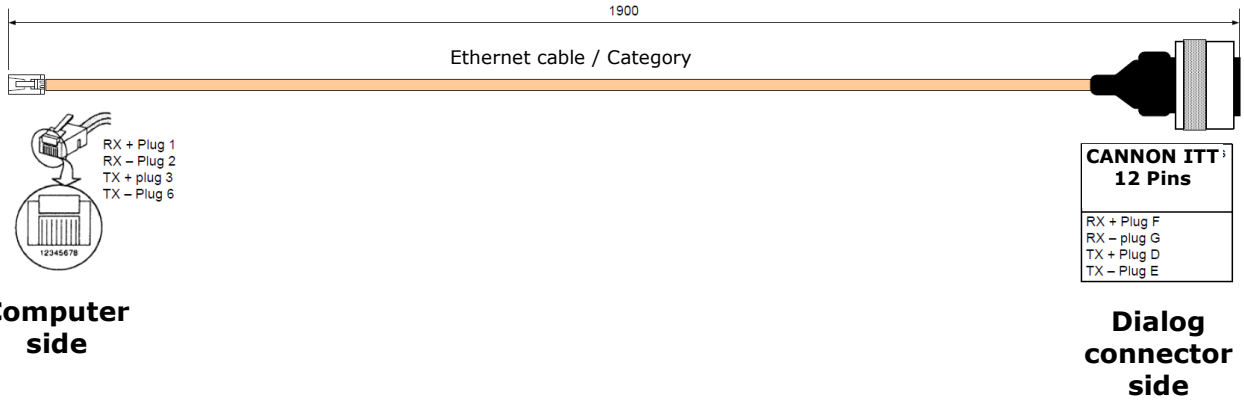
G.1.2 DATALOGGER

The data logger is integrated in the dashboard.
The logger's memory is 1 Gb.
Its operational temperature range is 10°C to 60°C.
Weight : 750g
The dashboard is plugged to the chassis loom (C4)

G.1.3 COMMUNICATION

The communication between the computer and the dashboard is made by ETHERNET Protocol (TCP/IP) using a Network card.

Communication Wire (8201 414 870)



Computer side

Dialog connector side

Dialog connector:

The dialog connector (Chassis loom C15) is fitted instead of the original right aerator.

Network configuration / IP Address :

You first have to enter the correct IP Address

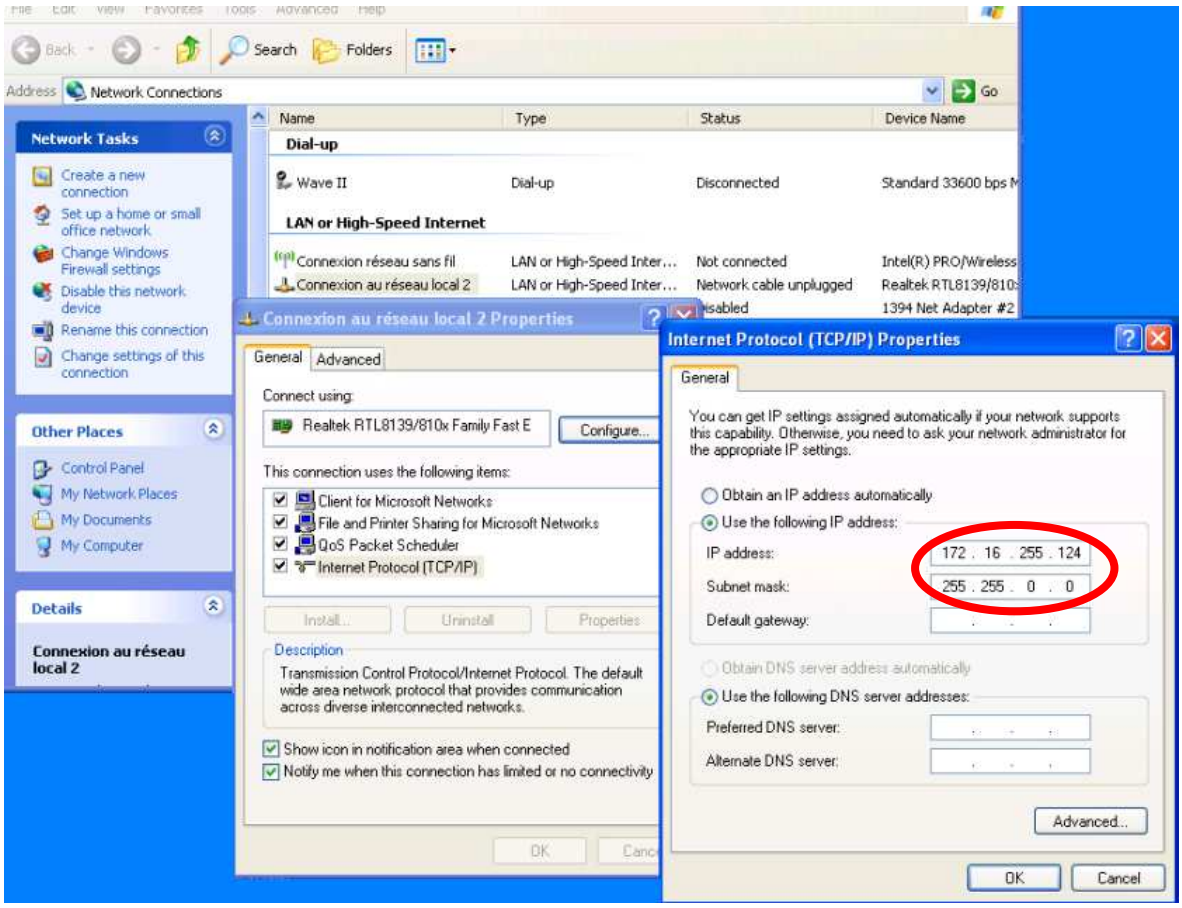
To do so, go to "Network Connections" :
"Start" menu
"Parameters"
"Network Connections"
Then make a right click on the good "local network" to choose "properties"

With Windows XP, select "internet protocol TCP/IP" and click on "properties"
NOTE : for Windows Vista & 7.0 choose "internet protocol" and "TCP/IP v4"

Fill the corresponding areas as below:

IP ADDRESS : 172.16.255.124 **SUBNET MASK : 255.255.0.0**

When everything is completed as described above, click on "OK"

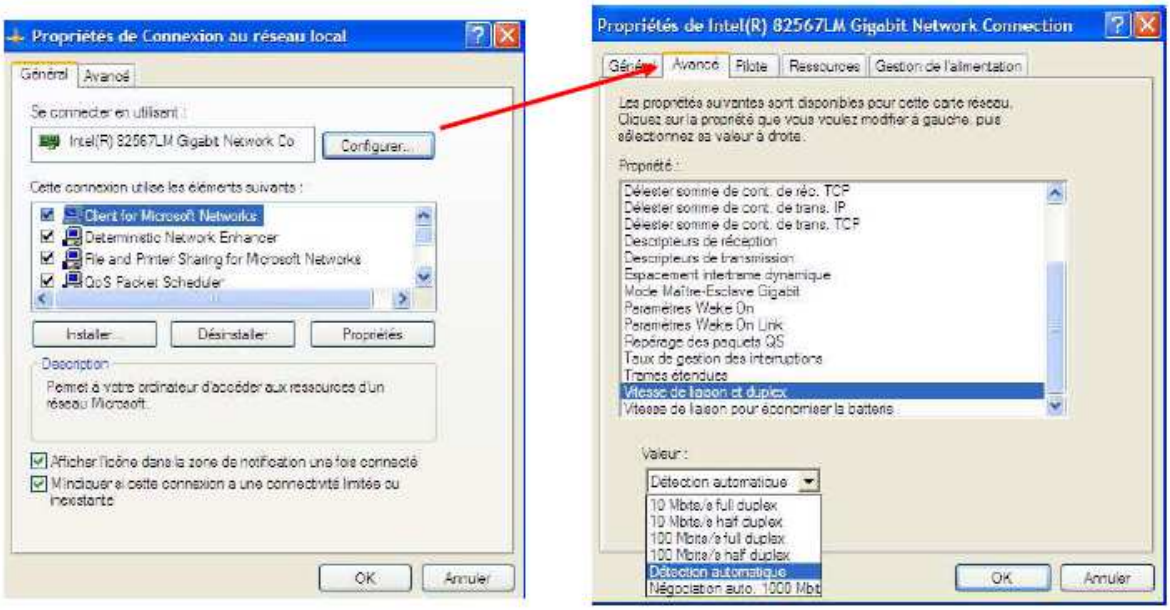


Communication Speed :

It may be necessary to reset your PC communication speed to **"Automatic",** following the instructions below:

Click on "Start" menu
"Parameters"
"Network Connections"
Right click on "local network" to choose "properties"

Click on "configure" and choose the tag "advanced"
Select « speed and duplex » line and choose « auto negotiation »


Propriétés de Connexion au réseau local
Général
Avancé
Se connecter en utilisant :
Intel(R) 82567LM Gigabit Network Co
Configurer...
Cette connexion utilise les éléments suivants :
Client for Microsoft Networks
Deterministic Network Enhancer
File and Printer Sharing for Microsoft Networks
QoS Packet Scheduler
Installer...
Désinstaller
Propriétés
Description
Permet à votre ordinateur d'accéder aux ressources d'un réseau Microsoft.
Afficher l'icône dans la zone de notification une fois connecté
M'indiquer si cette connexion a une connectivité limitée ou inexistante
OK
Annuler
Propriétés de Intel(R) 82567LM Gigabit Network Connection
Général
Avancé
Pilote
Ressources
Gestion de l'alimentation
Les propriétés suivantes sont disponibles pour cette carte réseau. Cliquez sur la propriété que vous voulez modifier à gauche, puis sélectionnez sa valeur à droite.
Propriété :
Délester somme de cont. de réc. TCP
Délester somme de cont. de trans. IP
Délester somme de cont. de trans. TCP
Descripteurs de réception
Descripteurs de transmission
Espacement interframe dynamique
Mode Maître-Esclave Gigabit
Paramètres Wake On
Paramètres Wake On Link
Repérage des paquets QS
Taux de gestion des interruptions
Trames étendues
Vitesse de liaison et duplex
Vitesse de liaison pour économiser la batterie
Valeur :
Détection automatique
10 Mbits/s full duplex
10 Mbits/s half duplex
100 Mbits/s full duplex
100 Mbits/s half duplex
Détection automatique
Négociation auto. 1000 Mbit
OK
Annuler

NOTE :
Depending on the Windows version, this line can be named differently. The most important thing is to choose the one which mentions the communication speed.

G.2 TOOLSET

Toolset software will allow you to:

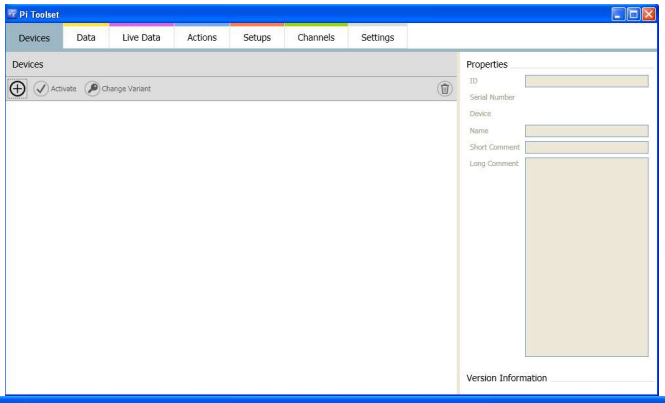
- Check live parameters (engine, Gearbox, chassis…etc)
- Download datas recorded in the datalogger
- Configure your dashboard (shiftlights, qualifying mode, beacons,…etc)
- Make and send the datas acquisition setup

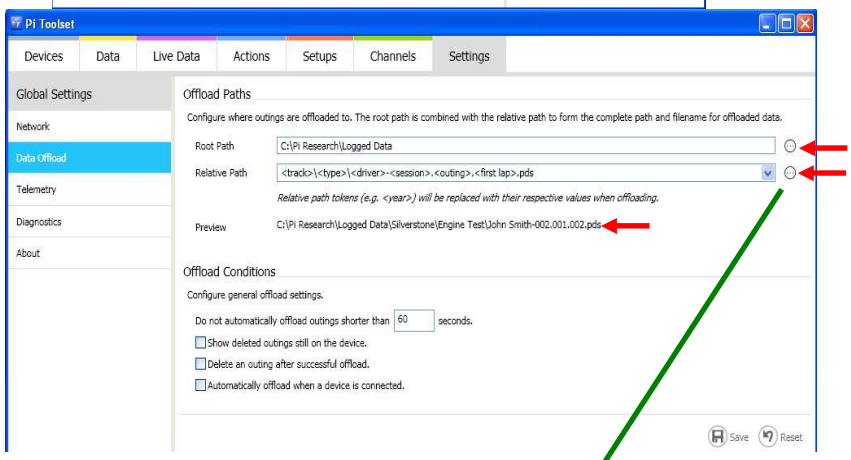
G.2.1 DATAS DOWNLOADING

Install and then open the software ***Toolset 3.x*** on your computer.

By default, the installation software proposes you the following destination:
C:\Program files\Pi Toolset

Reminder : Change the computer IP address to connect to the car:
IP address: 172.16.255.138
Subway Mask: 255.255.0.0





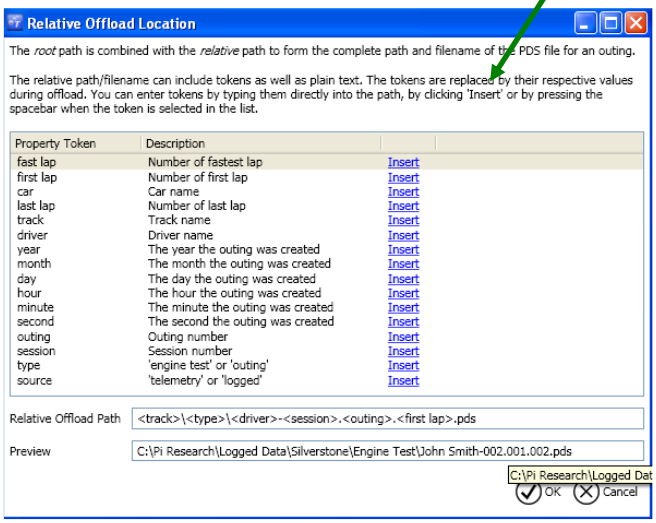
Offload Path configuration :

On the top menu,
Go to "Settings" / "Data Offload"

Then you can choose the :
- "root path"
- "relative path"

The *root* path is combined with the *Relative* Path to form the complete path and filename of the downloaded file (xxx.pds).

By clicking on ⋯ you can modify all of these parameters. It's possible to include the exact date, the session, the driver name,…etc



The "Preview" indicates :
- The name of the downloaded file
- where the file will be saved

Offload Conditions :

We also recommend you to configure the general offload settings as indicated above.

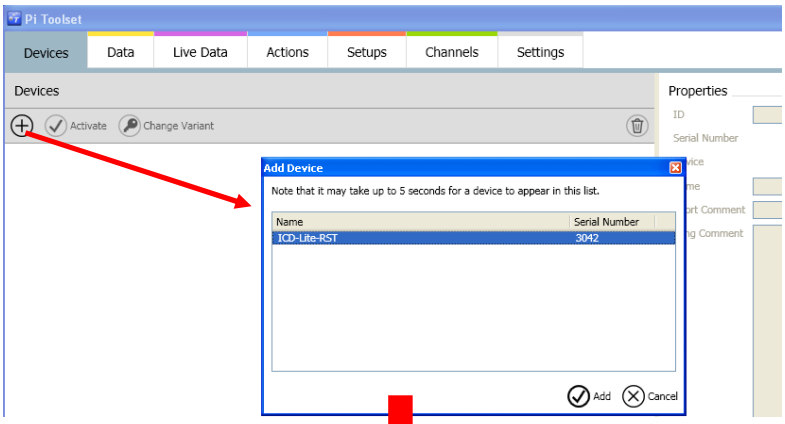
⚠ Don't forget to "Save" after every modification

Devices :

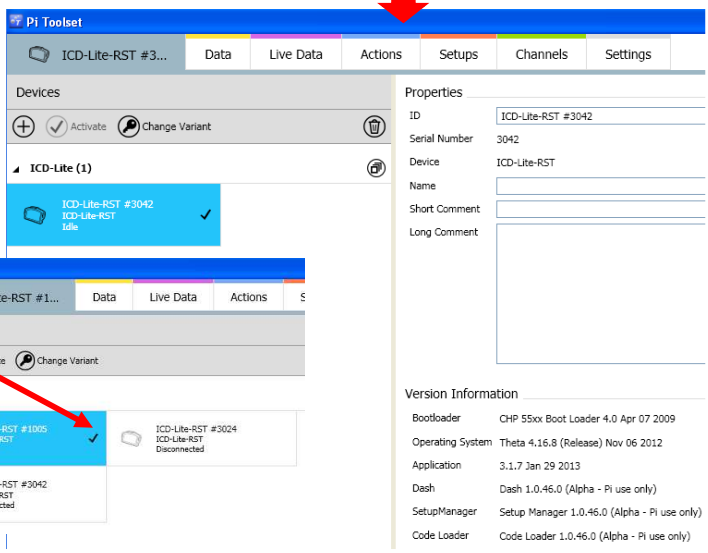
When you connect to a new dashboard system for the first time, you have to add and save this system :

On the top menu,
Go to "Devices"

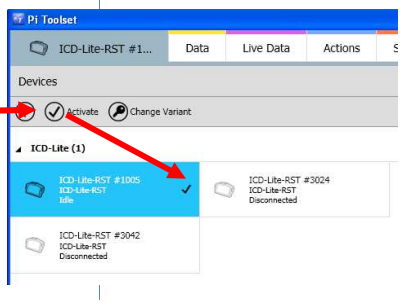
Click on ⊕ to add a device : the following windows appears and indicate the ICD-Lite-RST serial number (same number written on the back of the dash)
Select it and click on ✓ Add



The ICD is now saved and will be automatically detected every time you will connect to it.
You can saved as many ICD as you want in your Toolset configuration



To select the ICD you want to communicate with, it is necessary to click on ✓ Activate
➔ A "tick" appears near the ICD selected

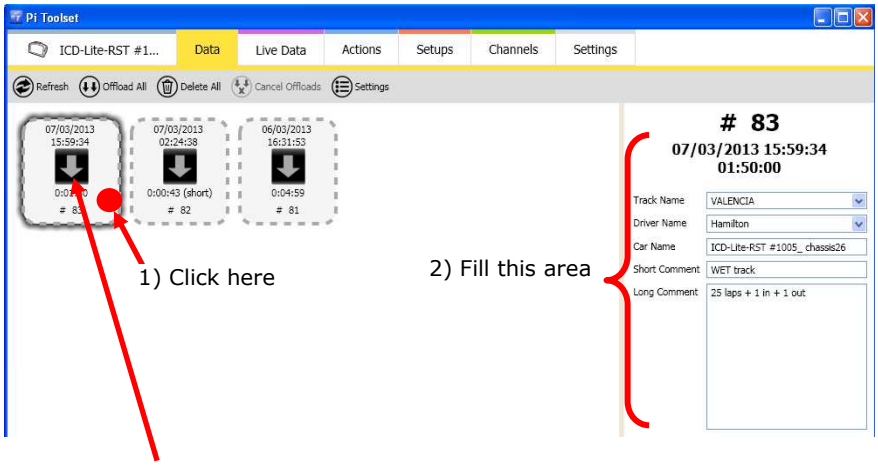


NOTE : on, the right column, it is possible to change the ID, the name and to add comment for this dashboard

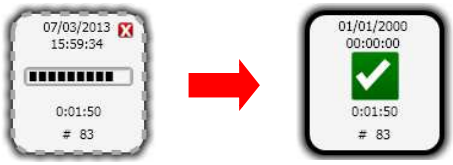
Data downloading :

On the top menu, Go to "Data"

You first have to fill the settings of the outing you want to down load:
1) Click on the data file you want to download (**DO NOT click on the arrow pointed to the bottom to avoid automatic offload**)
2) The right column appears, displaying the outing number, the date and the Run time. We recommend you to fill the track name, driver name, car name, and to add short and long comment if you want
NOTE : Filling this area will allow you to save the downloaded file following the offload path defined on previous page
3) Click on the arrow pointing to the bottom to start downloading



3) Click on the arrow to offload



datas offloading in progress

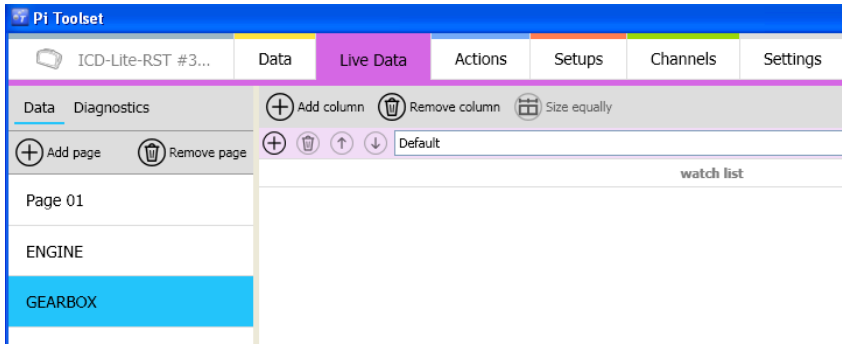
Datas offloaded

Select an Outing to start the downloading
The corresponding outing is saved to the path chosen previously.

G.2.2 LIVE PARAMETERS MONITORING

There is not standard "live datas" configuration. You have to make it by yourself.

On the top menu, Go to "Live Data"



List of pages :

You can add as many pages as you want by clicking on Add page
A list of blank pages will appear on the left column.

You can rename the pages as you want : ENGINE, GEARBOX…etc by clicking on the name area

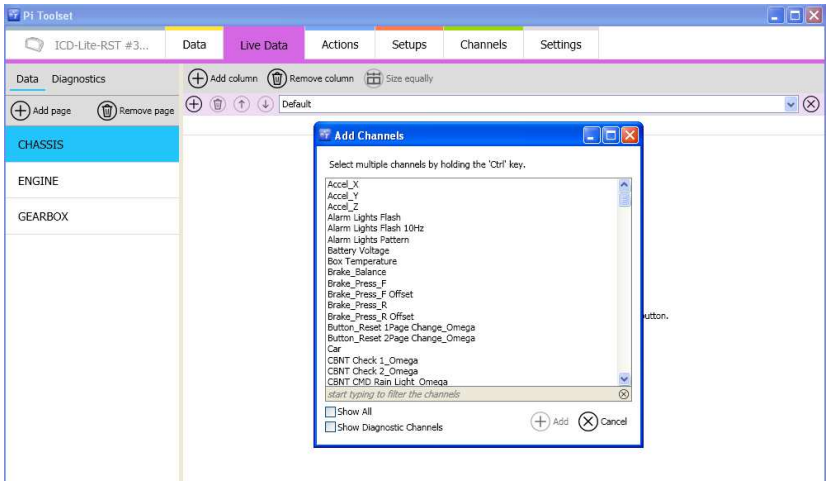
It is possible to remove a page by clicking on Remove page

Pages configuration :

On each pages, you can now add the channels you want for live monitoring :

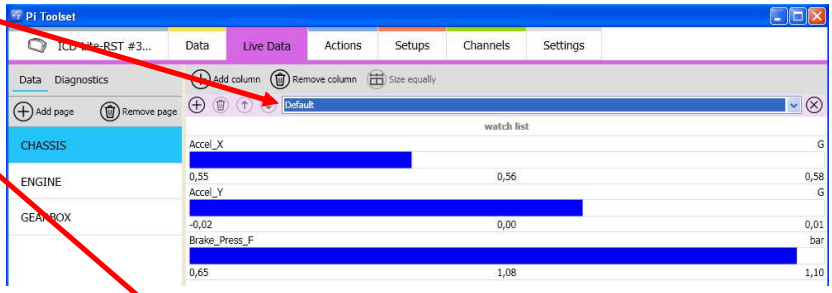
Add a column by clicking on Add column

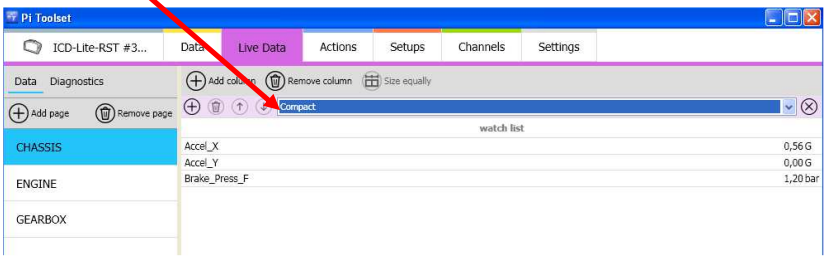
Then click on ⊕ to display the list of available channels and choose the desired channel(s)



You can choose between 2 types of display :

- Standard
- Compact





G.2.3 DASHBOARD CONFIGURATION

Toolset also allows you to configure the following parameters:

- Shift lights thresholds
- Beacon type configuration (single beacon receiver or GPS receiver)
- Qualifying mode configuration
- Circuit map

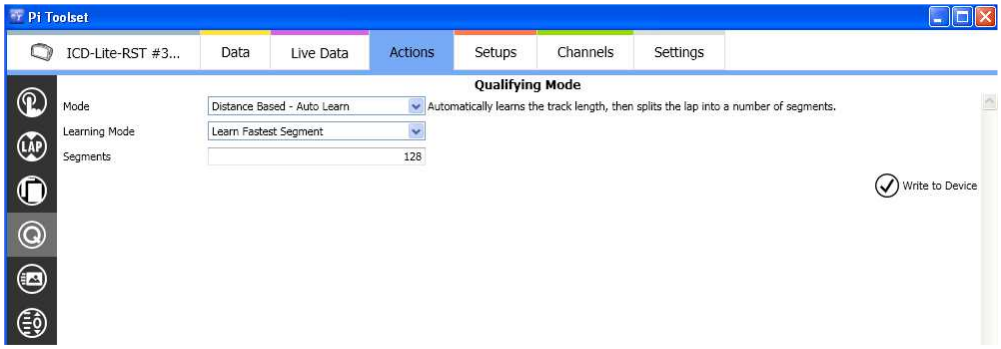
G.2.3.1 Qualifying mode (QM)

The Qualifying Mode allows drivers to compare in live their current lap to a reference lap according sectors defined in Toolset.

Qualifying mode access :

Connect your computer to the right ICD (check that a "tick" is displayed)

On the top Menu, go to "Action" and then click on to open the qualifying mode :



Qualifying mode configuration :

3 modes are available and are listed below:

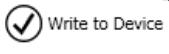
MODE 1 = AUTOMATIC MODE
Distance based : Autolearn

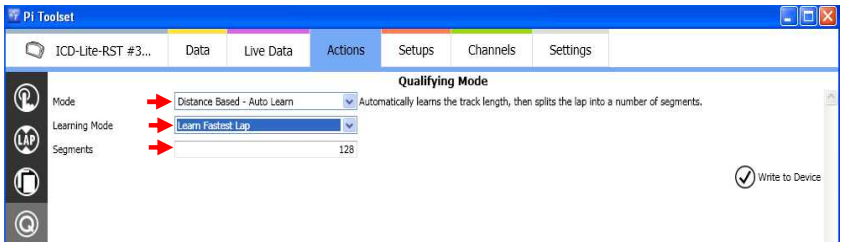
The ICD will automatically learns the track length and then split the lap into a number of segments

The reference lap can be learnt as :
- The fastest lap
- An addition of all best segments

It is possible to define from 2 to 128 segments

The track is divided in equal length portions depending on the number of segments chosen. For example, if 10 is chosen and the track length is 5,000m, the driver will observe on the dashboard a new split every 500m.

When the configuration is achieved, click on 



NOTE : by default, this mode is enable with the following configuration :
- Fastest lap learned
- 128 segments

MODE 2= SEMI-AUTO MODE
Distance based : PDS File reference

A xxx.pds file (downloaded file, see G.2.1) is selected as the reference lap (from the connected ICD or another one)
This reference lap is used to determine the track length and the track is automatically split into segments.

Click on ⋯ to browse your computer and load the outing (.pds file)

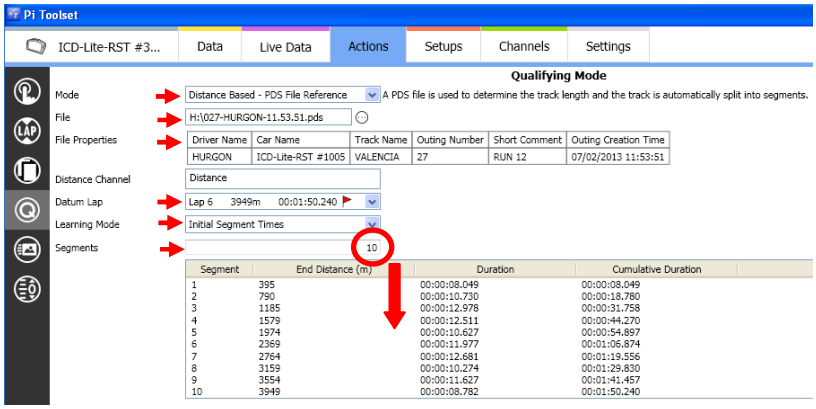
The "file properties" displays the main information of this outing (driver, track name, date…etc)

"datum lap" indicates the reference lap time selected. By default the best lap of the outing is chosen.

The reference lap can be learnt :
- As it was created (init segment times)
- As the fastest lap
- As an addition of all best segments

It is possible to define from 2 to 128 segments (as for MODE 1).

When the configuration is achieved, click on
✓ Write to Device


Pi Toolset
ICD-Lite-RST #3...
Data
Live Data
Actions
Setups
Channels
Settings
Qualifying Mode
Mode
Distance Based - PDS File Reference
A PDS file is used to determine the track length and the track is automatically split into segments.
File
H:\027-HURGON-11.53.51.pds
File Properties
Driver Name | Car Name | Track Name | Outing Number | Short Comment | Outing Creation Time
HURGON | ICD-Lite-RST #1005 | VALENCIA | 27 | RUN 12 | 07/02/2013 11:53:51
Distance Channel
Distance
Datum Lap
Lap 6 3949m 00:01:50.240
Learning Mode
Initial Segment Times
Segments
10
Segment | End Distance (m) | Duration | Cumulative Duration
1 | 395 | 00:00:08.049 | 00:00:08.049
2 | 790 | 00:00:10.730 | 00:00:18.780
3 | 1185 | 00:00:12.978 | 00:00:31.758
4 | 1579 | 00:00:12.511 | 00:00:44.270
5 | 1974 | 00:00:10.627 | 00:00:54.897
6 | 2369 | 00:00:11.977 | 00:01:06.874
7 | 2764 | 00:00:12.681 | 00:01:19.556
8 | 3159 | 00:00:10.274 | 00:01:29.830
9 | 3554 | 00:00:11.627 | 00:01:41.457
10 | 3949 | 00:00:08.782 | 00:01:50.240

MODE 3 = MANUAL MODE
Distance based : QM File generation

A xxx.qm file is created using a xxx.pds file in the TOOLBOX software (see G.4 Datas analysis)
The user :
- Loads a xxx.pds file on TOOLBOX
- Defines the segments exactly where he wants
- Exports file and saves it as a xxx.qm
- This xxx.qm file is used in Toolset qualifying mode

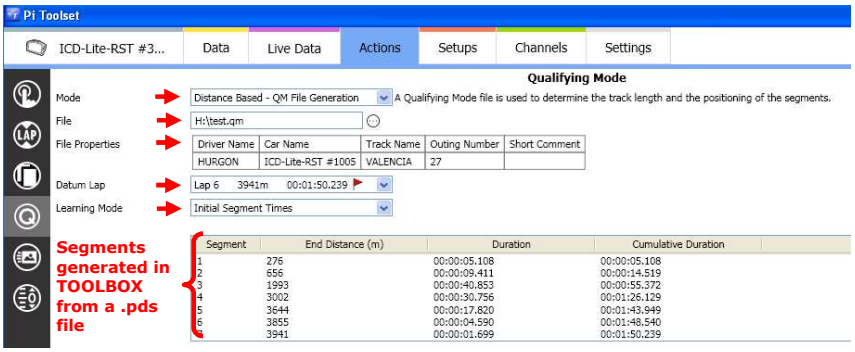
This reference lap is used to determine the track length and the positioning of the defined segments

Click on ⋯ to browse you computer and load the outing (.qm file)

The "file properties" displays the main information of this outing (driver, track name, date…etc)

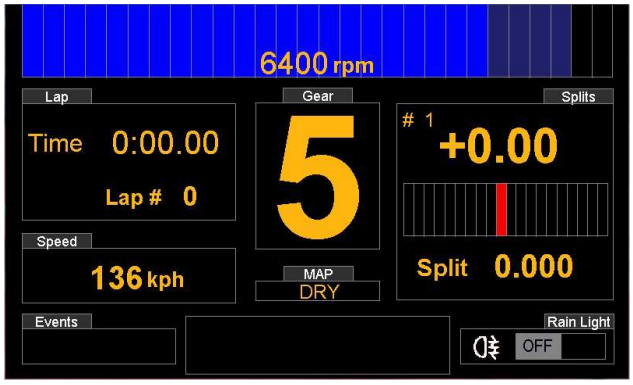
"datum lap" reminds the reference lap time selected

The reference lap can be learnt as for MODE 2 :
When the configuration is achieved, click on
✓ Write to Device


Pi Toolset
ICD-Lite-RST #3...
Data
Live Data
Actions
Setups
Channels
Settings
Qualifying Mode
Mode
Distance Based - QM File Generation
A Qualifying Mode file is used to determine the track length and the positioning of the segments.
File
H:\test.qm
File Properties
Driver Name | Car Name | Track Name | Outing Number | Short Comment
HURGON | ICD-Lite-RST #1005 | VALENCIA | 27
Datum Lap
Lap 6 3941m 00:01:50.239
Learning Mode
Initial Segment Times
Segments generated in TOOLBOX from a .pds file
Segment | End Distance (m) | Duration | Cumulative Duration
1 | 276 | 00:00:05.108 | 00:00:05.108
2 | 656 | 00:00:09.411 | 00:00:14.519
3 | 1993 | 00:00:40.853 | 00:00:55.372
4 | 3002 | 00:00:30.756 | 00:01:26.129
5 | 3644 | 00:00:17.820 | 00:01:43.949
6 | 3855 | 00:00:04.590 | 00:01:48.540
3941 | 00:00:01.699 | 00:01:50.239

Corresponding dashboard page :

The Qualifying mode is visible by the driver on "driver page" n°2 (refer to chapter *B-Presentation*)



+ / - : comparison with the reference lap selected after each segment

Bargraph : 1 bar = 1 tenth (ahead or late)

Split time: stay displayed 5 sec after the end of the segment

NOTE :
Depending on segment number defined, the split time remains displayed +/- long time
When 128 segments are defined, we can consider that it's a "live update"

G.2.3.2 Send a Circuit Map

This function allows loading a circuit map (xxx.bmp file) on "driver page" n°3 (refer to chapter *B-Presentation*)

Circuit Map change:

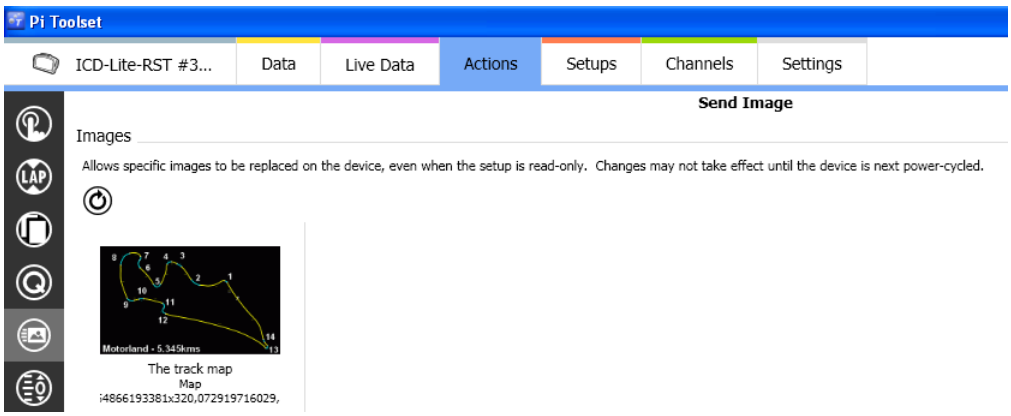
- Connect your computer to the right ICD (check that a "tick" is displayed)

- On the top Menu, go to "Action" and then click on to open the "send image" mode:

- Refresh the configuration by clicking on

- Make a double Click on the circuit map (a browser opens)

- chose a circuit (.bmp file)



- the selected circuit appears on this page to confirm that it has correctly been uploaded

NOTE : The circuits can be available form Renault Sport Extranet or created by the user.

G.2.3.3 ICD SETUP

The configuration of many information displayed or accessible through the ICD (as for example a part of the data acquisition channels list, the CAN decode…etc) is managed by a "SETUP" which has to be sent to the dash after every update.

Each SETUP is named as described below:

<Year> Clio CUP Base setup <Version> - <Tyre diameter> <Tyre manufacturer>.toolset

2 base setups will be available in the future
➔ 2 tyres manufacturers = 2 different tyre diameters

Setup 1 : 2013 Clio CUP Base Setup Vx.x – 610 MICHELIN.toolset
Setup 2 : 2013 Clio CUP Base Setup Vx.x – 620 DUNLOP.toolset

Both 2 setups are strictly identical except the 3 speed channels of the data acquisition channel list:
- Speed_FL
- Speed_FR
- Speed

Indeed, as the MICHELIN and the DUNLOP Tyre have a different diameter, the Speed (displayed and logged) is calculated differently.

After every tyre change, we strongly recommend you to load the right setup (corresponding to the tyre used) in the ICD to avoid confusion on Speed calculation

NOTE :
- By Default, every brand new ICD is delivered with a MICHELIN Setup
- As 2013 season will exclusively use MICHELIN tyre, only the setup ***2013 Clio CUP Base Setup Vx.x – 610 MICHELIN.toolset*** will be available

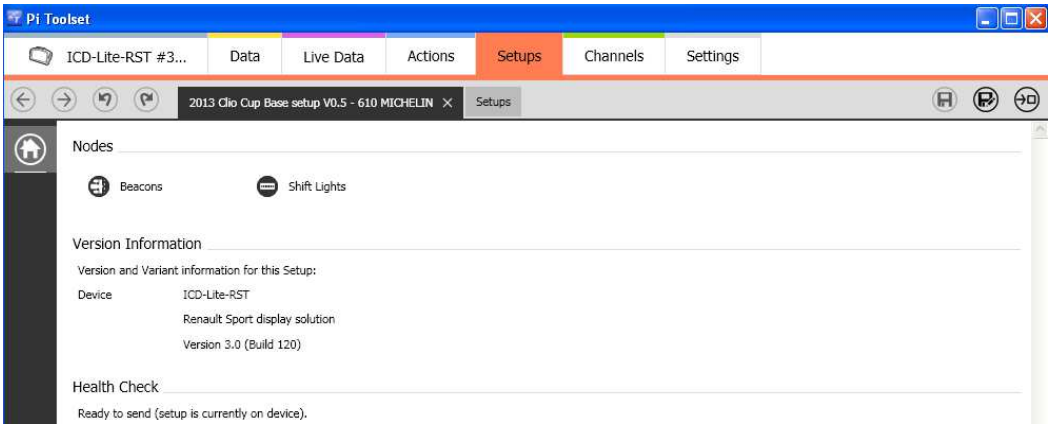
The last Setup version will always be available on the Renault Sport Extranet / area *SOFTWARES*. Don't forget to download the last version regularly

Setup access :

- Connect your computer to the right ICD (check that a "tick" is displayed)
- On the top Menu, click on 'SETUP"
- It is possible to :
  - Import a setup : click on Import. Browse you computer and load it
  - Read a setup from the active device : click on Read from Active Device

Setup opening :

Make a double click on the Setup to open it



Setup uploading and saving :

To send a setup to the device, click on

To save a setup on your computer, click on (save) or (save as)

The user has the possibility to configure 2 important parameters in the setup :

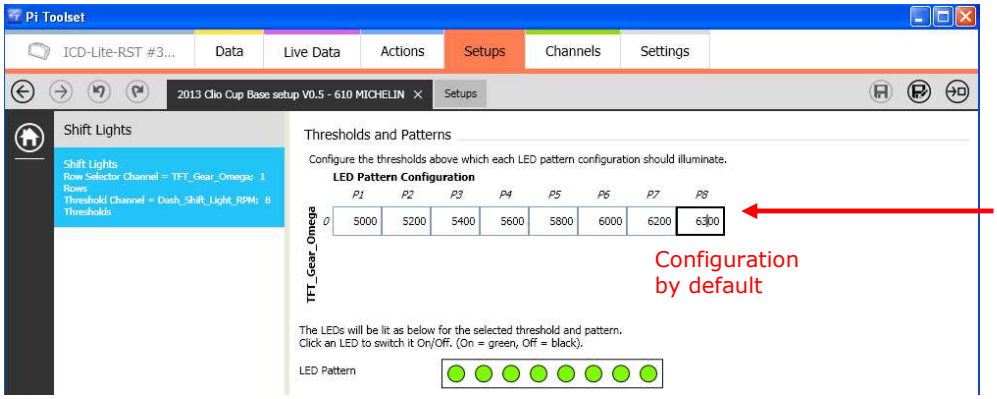
- The Shiftlight LEDS thresholds
- The beacon type

G.2.3.4 Shiftlights configuration

This function allows configuring the thresholds of the shiftlights LEDs lighting up (refer to chapter *B-Presentation*)

Shiftlight LEDs configuration access :

- Connect your computer to the right ICD (check that a "tick" is displayed)
- Open a setup (check the tyre type)
- In the Home Menu, click on Shift Lights to open the shift lights configuration mode :



Set the 8 LEDS thresholds

Reminder: the Engine limiter is 6,500rpm

Send the setup to the device by clicking on

G.2.3.5 Beacon configuration

This function allows configuring the beacon mode.

Beacon configuration access :

- Connect your computer to the right ICD (check that a "tick" is displayed)
- Open a setup (check the tyre type)
- In the Home Menu, click on Beacons to open the beacons configuration mode:

2 main modes available:

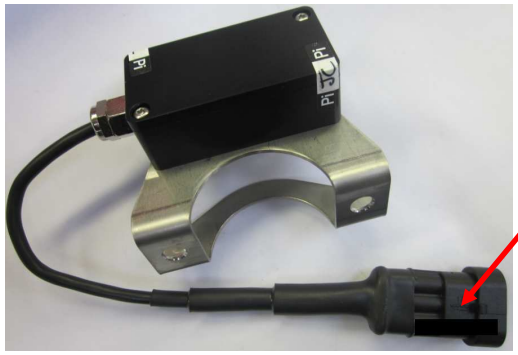
MODE 1: classic beacon receiver

Reminder (chapter *F-wiring looms*):

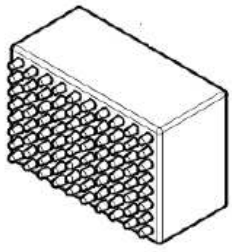
The Lap beacon is fitted on rear left or rear right roll cage tube and must be visible through door window.

It allows:

- the Lap decomposition in the data acquisition system
- Lap time displayed on the dashboard



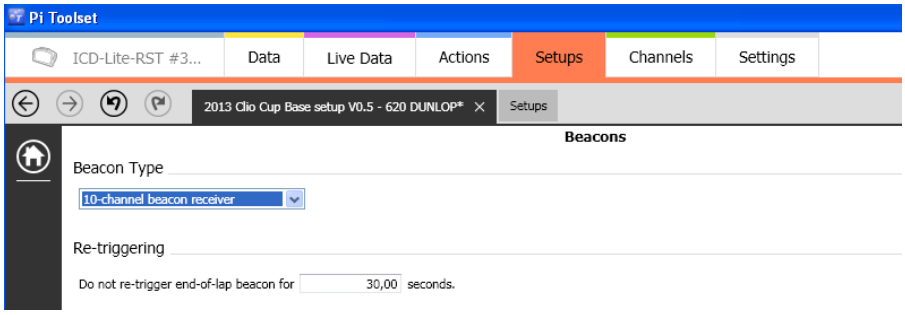
CHASSIS LOOM
C21



To "cut" the laps using the lap beacon, the presence of the corresponding COSWORTH track wall beacon (7711166112) is required:

Configuration:

In Beacon type, **select "10 -channel beacon receiver"**



During every Race meeting, only the standard beacon receiver (as indicated above) must be selected. The track beacon is fitted by the Renault Sport championship organizer.

MODE 2 : GPS beacon receiver

Reminder (chapter *F-wiring looms*):

The GPS Receiver is an option. It is plugged directly on the chassis loom near the dialog connector and must be fitted as shown below:

GPS receiver fitting (magnetic)

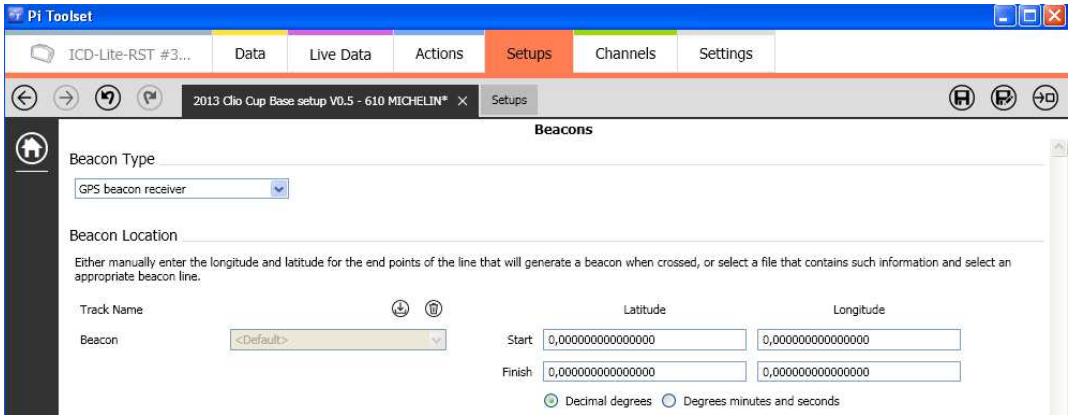
CHASSIS LOOM
C20

It Allows:

- the Lap decomposition in the data acquisition system
- to compare trajectories in data acquisition
- to avoid a track beacon requirement
- Lap time displayed on the dashboard

Configuration :

In Beacon type, **select "GPS beacon receiver"**
The GPS beacon must not be used during an event organized by Renault Sport.
It must be used only for private or non official testing.



To correctly "cut" the lap, it is necessary to fill the start and finish lines GPS coordinates (latitude and longitude) of the corresponding circuit. 2 possibilities:

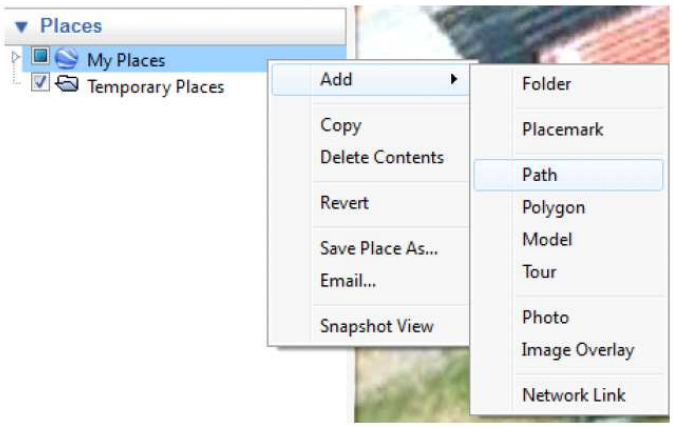
1) The track GPS coordinates already exists on the library (.kml file), in this case, just load it by clicking on
2) If not, you have to fill the GPS coordinates or to create a new start/finish line circuit using the following procedure :

GPS Beacon configuration from Google Earth :

Introduction:
Using Google earth it is possible to create a start finish line that can be used to generate beacon events. The following will guide you through this process.

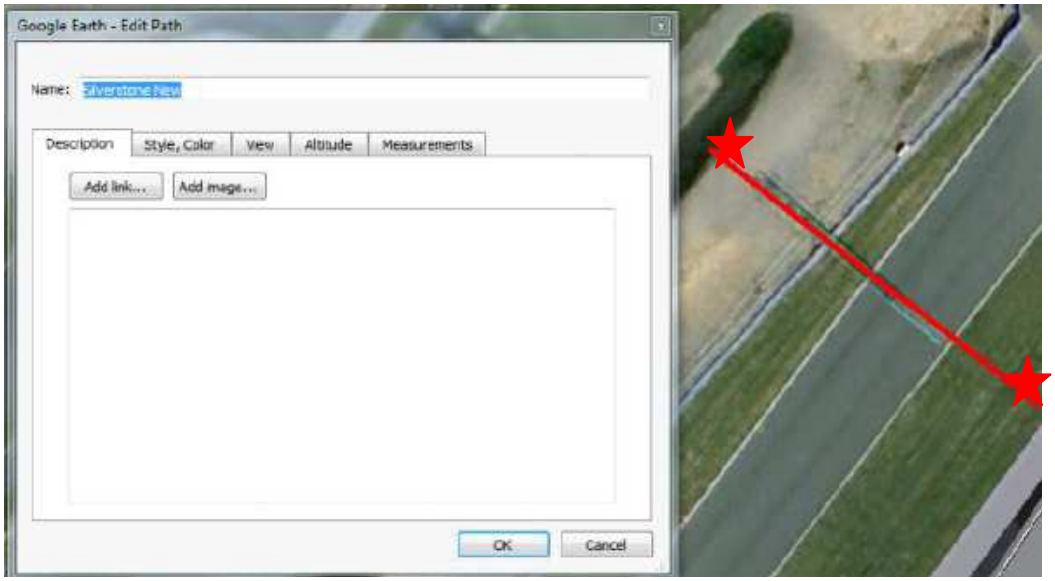
Beacon locations can be created using Google Earth. The following will talk you through creating a beacon location file as well as importing it into Toolset:

1) Download, Install and the Open ***Google Earth***
2) Right Click on "My Places"
3) Click on "add" and then "path"



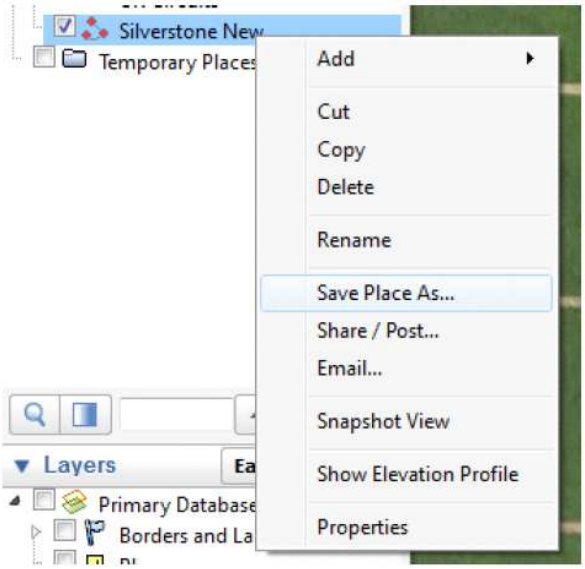
4) The Edit path window will appear
   - Enter a name for your "Start Finish Line"
   - Using the mouse, draw the start finish line as you wish it to be used (you can modify the style and the colour of the line)
   - The line must be composed of 2 points (start and end)

NOTE : This line should completely cross the track in the area you need. A beacon will be triggered every time this line is crossed.

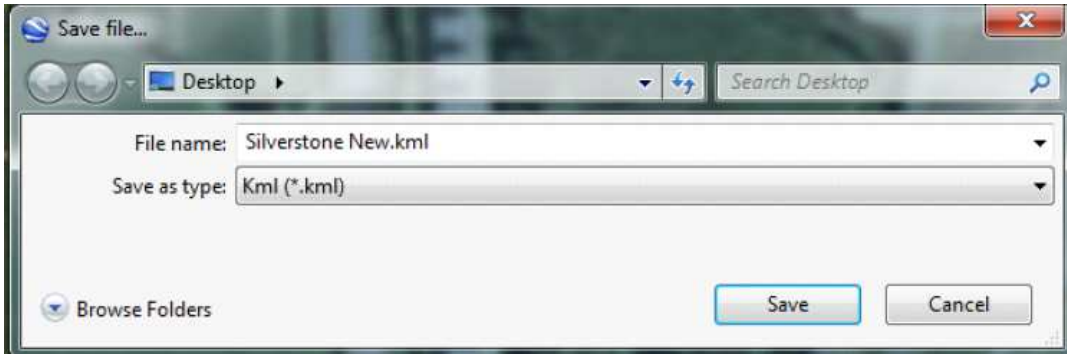


5) You can add multiple "Start Finish" lines to a single file if the circuit in question has got multiple lines

6) Once you have created your "Start Finish" line you will need to export it:
   - Right click on the path and click on "Save Place As…"



7) It is important that you select the *.kml file format that is available with the drop down box



8) Once you have created you "Start Finish" .kml file, it can be imported into Toolset using the Beacons configuration (see page C.15) by clicking on

9) Once you have added the track you will be able to select the Beacon, if you have added multiple paths to a single .kml you will be able to select the one you want from the drop down menu.

NOTE :

Even if the GPS is not selected as beacon, the GPS coordinates (latitude, longitude, speed, altitude) are still logged in the ICD and allow the Map drawing and trajectory comparison in TOOLBOX software (see G.4 data analysis)

During every Race meeting, only the standard beacon receiver (as indicated above) must be selected. Configuring the GPS as a beacon is strictly forbidden.

G.3 DATA ACQUISITION CHANNEL LIST

The following table presents the complete channel list logged in the ICD.
"Bit indicator column" indicate if this channel can be considered as a Bit field in TOOLBOX.
To facilitate the understanding, except classic channels (brake pressure, accel X and Y, distance, speed…etc), all channels are grouped behind a family name :

Dash_ (Cosworth ICD LITE)
ECU_ (Cosworth SQ7Di)
EN_ (Engine)
CBNT_ (XAP CBNT)
GB_ (gearbox)
QM_ (qualifying mode)
GPS_

ICD Channel name	Signification	Bit indicator**
Accel_X	Longitudinal acceleration	
Accel_Y	Lateral acceleration	
Accel_Z	Vertical acceleration	
Battery Voltage	Battery voltage	
Brake_Balance	Brake balance (% front)	
Brake_Press_F	Front brake pressure	
Brake_Press_F Offset	Front brake pressure offset (must be 0 after a reset procedure)	
Brake_Press_R	Rear brake pressure	
Brake_Press_R Offset	Rear Front brake pressure offset (must be 0 after a reset procedure)	
CBNT_CMD_Rain Light_Omega	Rain light command sent by CBNT	
CBNT Check 1_Omega	CBNT Diagnostic / Always = 0xAA (dec = 170)	
CBNT Check 2_Omega	CBNT Diagnostic / Always = 0x55 (dec = 85)	
CBNT_SWT_State	CBNT switches state (ON or OFF) Pin_H_Stop light switch Pin_G_ Rain light switch Pin_B_Light left switch (Front and rear) Pin_A_light right switch (Front and rear)	YES
CBNT_PCM_Diag_1	CBNT status (Ok or fault) Pin_N_ Wheelspeed Pin_M_XAP gearbox actuator Pin_L_+12v output	YES
CBNT_PCM_Diag_2	CBNT status (Ok or fault) Pin_T_dash Pin_D_VVT Pin_C_HP pump/waste gate/ pop off Pin_J_ECU Pin_ K_steering wheel Pin_F_ starter excitation Pin_E_geabox barrel unlocking	YES
CBNT_PCM_Diag_3	CBNT status (Ok or fault) Pin_H_Stop light Pin_G_rain light Pin_B_Light left switch (Front and rear) Pin_A_light right switch (Front and rear)	YES
CBNT_PCM_Diag_4	CBNT status (Ok or fault) Pin_h_g_ignition coil Pin_V_W_low P fuel pump / lambda sensor Pin_R_P_Wiper Pin_f_winscreeen washer	YES

CBNT_PCM_Diag_5	CBNT state (ON or OFF) Pin_Z_brake light cmd Pin_e_rain light cmd Pin_j_light cmd Pin_S_wiper at ref position Pin_Y_ignition Pin_U_low press fuel pump cmd Pin_X : not used Pin b_c_CAN2	YES
CBNT_PER1A_STATE	CBNT state (ON or OFF) Pin_N_ Wheelspeed Pin_M_XAP gearbox actuator Pin_L_+12v output	YES
CBNT_PER5A_STATE	CBNT state (ON or OFF) Pin_T_dash Pin_D_VVT Pin_C_HP pump/waste gate/ pop off Pin_J_ECU power Pin_ K_steering wheel Pin_F_ starter excitation Pin_E_gearbox barrel unlocking	YES
Dash_Alarm_Battery Voltage	Battery alarm displayed on ICD	
Dash_Alarm_EN_Air_Temp	Air temp alarm displayed on ICD	
Dash_Alarm_EN_High_Fuel_Press	High Press fuel alarm displayed on ICD	
Dash_Alarm_EN_Low_Fuel_Press	Low press fuel alarm displayed on ICD	
Dash_Alarm_EN_Oil_Press	Engine Oil press alarm displayed on ICD	
Dash_Alarm_EN_Water_Temp	Water temp alarm displayed on ICD	
Dash_Box_Temp	Dashboard temperature	
Dash_Error_EN_Boost_Press	Boost P sensor error message displayed on ICD	
Dash_Error_EN_High_Fuel	HP fuel sensor error message displayed on ICD	
Dash_Error_EN_Low_Fuel	LP fuel sensor error message displayed on ICD	
Dash_Error_EN_Man_Press_Air_T	Manifold P sensor error message displayed on ICD	
Dash_Error_EN_Oil_Press	Oil P sensor error message displayed on ICD	
Dash_Error_EN_Pedal	Gas pedal potentiometer error message displayed on ICD	
Dash_Error_EN_Throttle	Throttle position sensor error message displayed on ICD	
Dash_Error_EN_VVT1	VVT position sensor error message displayed on ICD	
Dash_Error_EN_Water_Temp	Water T sensor error message displayed on ICD	
Dash_Error_GB_Actuator	Gearbox XAP actuator error message displayed on ICD	
Dash_Error_GB_Barrel	Gearbox barrel error message displayed on ICD	
Dash_Error_SW_Down_Paddle	Down paddle error message displayed on ICD	
Dash_Error_GB_R_Solenoid	GB barrel sensor error message displayed on ICD	
Dash_Error_GB_Up_Cont	GB upshift sensor error message displayed on ICD	
Dash_Error_SW_Up_Paddle	Up paddle error message displayed on ICD	
Dash_Error_Speed	Speed sensor error message displayed on ICD	
Dash_Error_Steering	Steering angle sensor error message displayed on ICD	
Dash_Free_CPU	ICD Free CPU	
Dash_Inp_1_Volt	ICD input 1 voltage (rear brake press sensor)	
Dash_Inp_2_Volt	ICD input 2 voltage (front brake press sensor)	
Dash_Inp_3_Volt	ICD input 3 voltage (fuel level sensor)	
Dash_Log_Mem_Rem	ICD logging memory remaining	
Dash_Log_Status	ICD logging status (OK / fault)	
Dash_Log_Time_Rem	ICD logging time remaining	

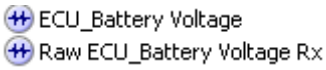
Dash_Logging	ICD logging state (Yes / no)	
Dash_Serial_Number	ICD serial number	
Distance	Distance calculated from the beginning of the RUN by ICD	
ECU_Alarms	Alarm min/max recorded (Yes/No) Water T, OilP, batt V, air temp, fuel Hp, fuel LP	YES
ECU_Autocal_Code_States	PPS (pedal) / TPS (Throttle) calibration state	YES
ECU_Battery Voltage	ECU battery voltage	
ECU_serial number	ECU serial number	
ECU_distance	Distance calculated from the beginning of the RUN by ECU calculated with MICHELIN 610 tyres (="Distance" channel when a MICHELIN 610 setup is load	
ECU_Ouputs_States	ECU output states (ON/OFF) LP_Fuel_pump Slow speed water fan High speed water fan	YES
ECU_Switch_States	ECU switch states (ON/OFF) Pit lane Switch Gear switch Up_contactor switch Up_paddle switch Down paddle switch	YES
ECU_Throttle_FBW_Status	Fly by Wire (Gas Pedal/Throttle) status (OK/fault) FBW, Pedal, Throttle A and B, diff check, noise check	YES
EN_Air_Temp	Air temperature sensor value	
EN_Baro_Press	Barometric pressure value (learn before engine start)	
EN_Boost_Press	Boost pressure sensor value	
EN_Engine_Error	Engine sensor error (part 1) Water T, throttle, oilP, crank, airT, Baro P, manifold P, crank and camshaft signal, pit lane ctrl, HP fuel, WSP, injectors	YES
EN_Engine_Error_2	Engine sensor error (part 2) Pedal, boostP, VVT, steering, gear pot, upshift cont, LP fuel…etc	YES
EN_Engine_Mode	Engine status ; RUN, SYNC 360, SYNC 720…etc	YES
EN_Engine_Status	Engine status Rev_limiter, rev_cut, pit_lane_cruise, sync …etc	YES
EN_High_Fuel_Press	High Fuel pressure sensor value	
EN_HP_fuel_pump _tgt	High Fuel pressure sensor value	
EN_Inj_Time	Injection time (ms)	
EN_Low_Fuel_Press	Low Fuel pressure sensor value	
EN_Manifold_Press	Manifold pressure sensor value	
EN_Map	Map selected on facia switch panel (0 : DRY / 1 : WET)	
EN_Oil_Press	Oil pressure sensor value	
EN_Pop_Off_Pos	Pop off valve position	
EN_Pop_Off_tgt	Pop off valve position target	
EN_RPM	Engine RPM (TDC sensor value)	
EN_VVT_Status	inlet Cam status : VVT_pos/VVT_tgt (OK/fault)	YES
EN_VVT1_Pos	Intake camshaft position (real position of intake camshaft)	
EN_VVT1_Tgt	Intake camshaft target value (send by ECU to dephaser)	
EN_Water_Fan_State	Water fan state 0: OFF / 1 : low speed / 2 : High speed	
EN_Turbo_Water_Fan_State	Turbo air exchanger fan state : O:OFF / 1:ON	
EN_Water_Temp	Water temp sensor value	

EPS_warning status	Electric power steering warning status	
Fuel_Level	Fuel cell level	
Fuel_Used	Fuel used since the begging of the Run	
GB_actuator_cmd_diag	XAP Gearbox actuator command diagnostic Cmd 21v (UP/DN), Cmd 14v (UP/DN), Cmd 14v return	YES
GB_actuator_out_current	XAP Gearbox actuator out current (Amps)	
GB_actuator_sensor_1	XAP Gearbox actuator sensor 1 state	
GB_actuator_sensor_2	XAP Gearbox actuator sensor 2 state	
GB_actuator_state	XAP Gearbox actuator state Return UP/DN, ready, active, idle, return	YES
GB_actuator_volt	XAP Gearbox actuator voltage	
GB_down_cmd	ECU downshift cmd to XAP Gearbox actuator	
GB_high_power_cmd	ECU shifting high power cmd to XAP Gearbox actuator	
GB_low_power_cmd	ECU shifting low power cmd to XAP Gearbox actuator	
GB_up_cmd	ECU upshift cmd to XAP Gearbox actuator	
GB_Up_Cont_State	Gearbox upshift contactor state (0/1)	
GB_Voltage	Gearbox barrel potentiometer voltage	
Gear	Gear ratio engaged	
Global alarm	Global alarm	YES
GPS_Alt	GPS altitude signal	
GPS_Lat	GPS latitude signal	
GPS_Long	GPS longitude signal	
GPS_Sats	GPS satellites detected	
GPS_Speed	GPS speed	
Lap Distance	Lap distance	
Lap Number	Lap number	
Lap Time	Current Lap time	
Lap_Beacon	Lap beacon signal cut (becomes 0 when track beacon is detected)	
Logging	ICD logging (YES/NO)	
Mileage	Total car mileage calculated by ICD	
Outing Number	Outing number	
Outing Time	Outing time	
Pedal	Gas pedal potentiometer value	
Pedal_1_raw	Gas pedal potentiometer raw 1 voltage	
Pedal_1_raw	Gas pedal potentiometer raw 2 voltage	
Previous lap time	Previous lap time recorded	
QM Cum Seg Time	Qualifying mode cumulative segment time	
QM Cum Seg Time Diff	Qualifying mode cumulative segment time difference compared to the reference lap	
QM Seg Time Diff	Qualifying mode segment time difference compared to the reference lap	
QM Segment Number	Qualifying mode segment number	
QM Segment Time	Qualifying mode segment time	
QM Status	Qualifying mode status	
QM predicted lap time	Qualifying mode predicted lap time	
QM reference lap time	Qualifying mode reference lap time	

Reset_Button	Reset button pressed on facia switch	
Reset_Cmd	Reset command (managed by the ICD)	
Reset_Response	Reset command response (ECU)	
Dash_Shift_Lights	Dash RPM LEDs lighting up (1 to 8)	YES
Speed	Average speed (FL and FR)	
Speed_FL	Front left wheel speed value	
Speed _FR	Front right wheel speed value	
Steering_Angle	Steering angle sensor value	
SW_Down_Paddle	Down paddle pulled	
SW_Switch_States	Steering wheel button panel state (ON/OFF) Wiper/pit/clean/page/light/gear/free	YES
SW_Up_Paddle	Up paddle pulled	
SW_page	Steering wheel "page" button pressed	
Throttle_1_Raw	Throttle potentiometer : track 1 tension	
Throttle_2_Raw	Throttle potentiometer : track 2 tension	
Throttle	Throttle potentiometer position	
Tyre_diameter	Tire diameter selected (depends on setup sent to the ICD)	
Steering_Status	Steering status	
Steering_Speed	Steering speed	
Total_Distance	Total car distance calculated in ECU (above 400rpm)	
Tr_state	Gear control strategies steps	YES

NOTE 1 : In the datas downloaded, you will also see a list of channel with a name starting by "Raw". Theses channels are used for diagnostic and correspond to channels coming through CAN from the ECU

For example, you will find the physical channel : "ECU_battery voltage" and its corresponding "Raw" : Raw_ECU_Battery voltage



****NOTE 2 :** Concerning the "bit indicator"

It is possible to change the configuration of the bit caption to observe directly its status or its state. To make it, make a right click on the bit indicator and tick or not the last line "show bit caption"

DATA ANALYSIS / TOOLBOX

G.3.1Configuration via software

The software used to analyse data acquisition is PI Toolbox.

Software installation

The Pi Toolbox software can be installed with the USB Stick provided by Renault Sport or directly from the Renault Sport extranet

How to use the software?

Once this software is opened, select a workbook, then refer to the next paragraph to find out how to open and analyse the data.

G.3.2 Opening datas

To open data:

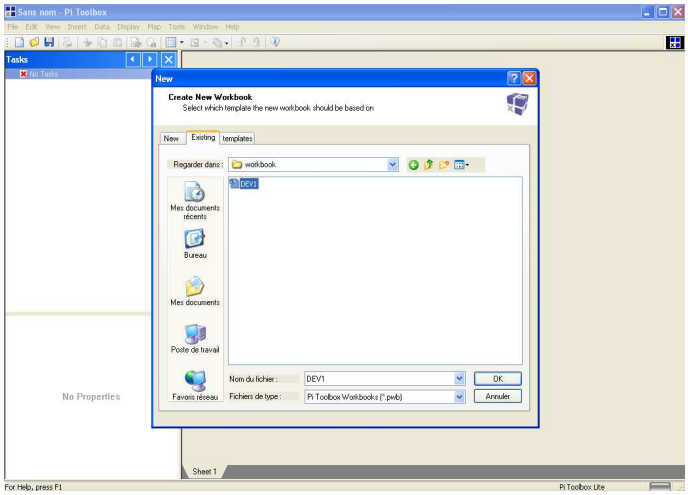
- Open PI Toolbox,
- Select a workbook (.pwb)

NOTE :

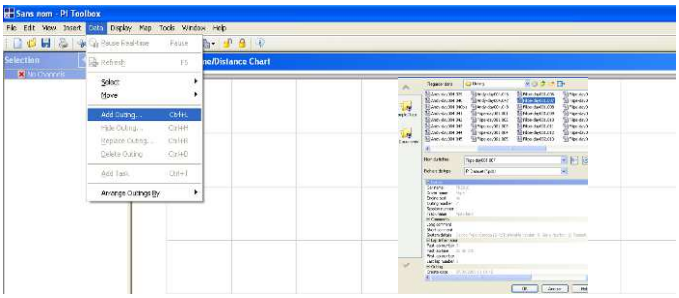
- If you want to create a new workbook, go to Files -> New. Select a default model of template, then create your own workbook from this one.
- You can also use the predefined workbook available on the Renault Sport Extranet:

"clio-cup-default.pwb"

⚠ Regarding the Toolset limited access, only one sheet per workbook can be used. But you can use as many workbook as you want.

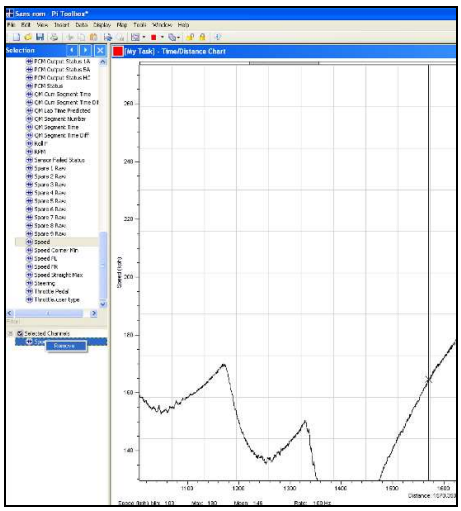


- Go to Data -> Add Outing
- Select the run you want to open (.pds file)



G.3.3 Analyzing downloaded data

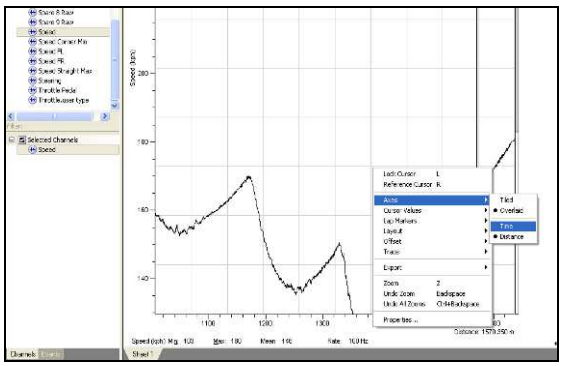
G.3.3.1 Displaying a channel



- To display a channel, select the left column and use the left and right arrow in the bar until you reach the "Selection" window
- Double click on the channel name.
- To remove a channel from the graphic window, right click on the channel name displayed on the bottom of the left column and select remove.

- Several channels can be overlaid.
- To ZOMM IN, press Ctrl and select the part of the curve you want at the same time, or press Z.
- To ZOOM OUT, use BACKSPACE.

G.3.3.2 Changing the reference axis (time/distance)

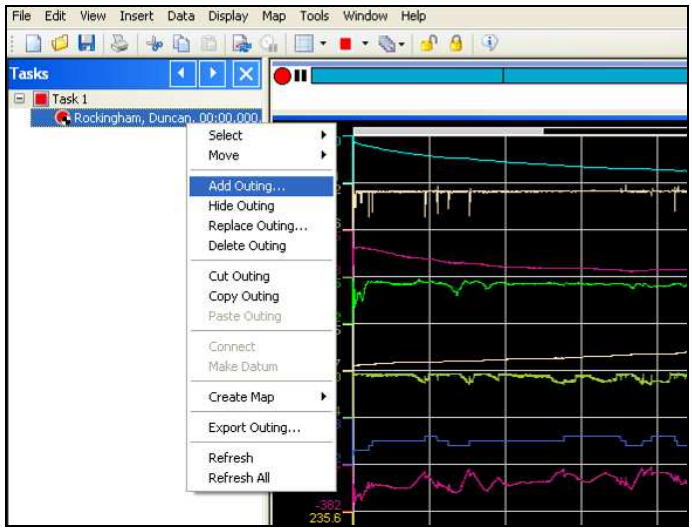


It is possible to change the reference axis: you have the choice between distance and time.

- To change the axis, right click on the graph, then select Axes and select Time or Distance.

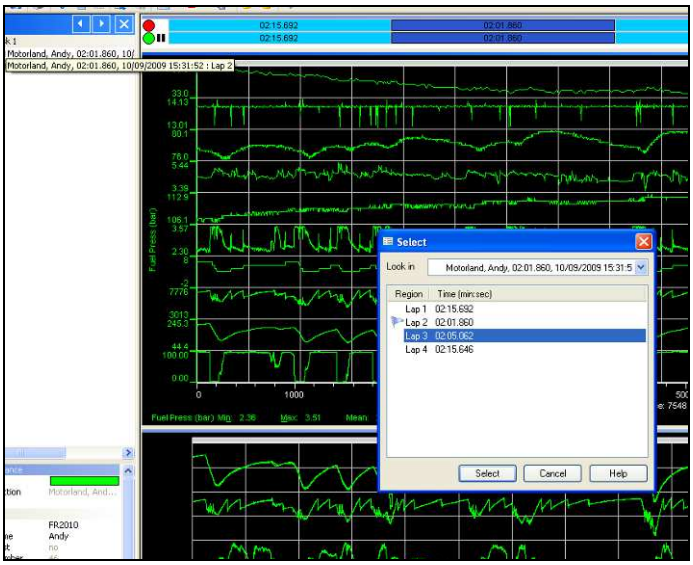
G.3.3.3 Comparing laps

You can overlay and compare two or more laps.
Select the "Tasks" window in the left column, right click and select "Add outing".



If you want to compare two laps from the same run, select this run and then double click on it in the left column; a window appears, select the lap.

If you have different laps overlaid, and you want to shift one compared to another, select the lap in the graph legend on the right, press "O" and move the curve. Press "O" again to exit this option.

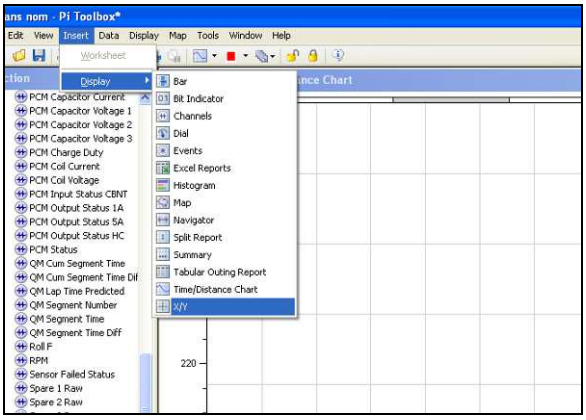


Note: to add a "compare time" function, create a math channel using the following command: compareDist([Elapsed Lap Time])

G.3.3.4 Graph type

It is possible to insert different types of graphs or tables.

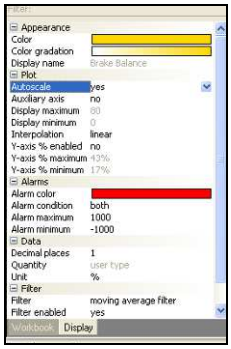
- Go to Insert
- Display
- and select the type of graph, table or map.



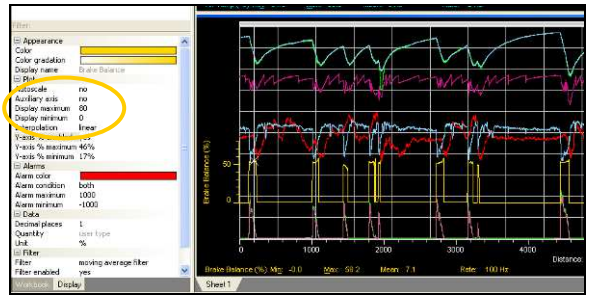
G.3.3.5 Graph properties

It is possible to change the scale of the graph:

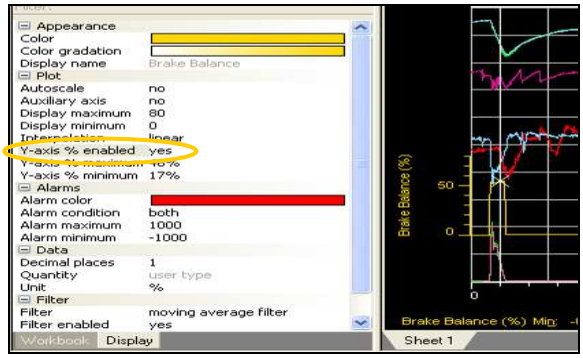
In the channel properties (in "Display"), if Autoscale is selected ("yes"), the scale is automatically calculated.



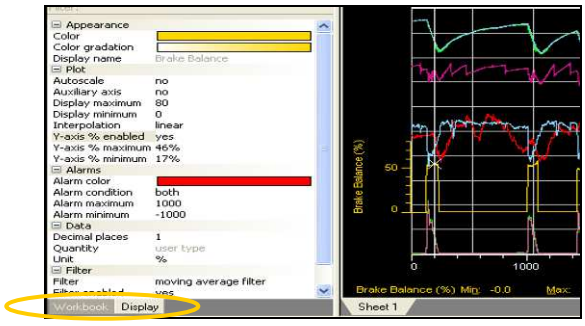
To choose the scale manually, Autoscale should not be selected ('No').
Set up the scale using "Display minimum" and "Display maximum"



You can move the position of the graph along the Y axis: in "Y-axis % enabled", "yes" should be selected. Click on the left column when the channel is selected, and manually move the curve in the graphic window.
This feature only works in "overlaid" mode (refer underneath).



When you modify in "Display", the change is only in the selected graphic window, whereas with "Workbook", all the graphic windows are modified.



The curves can be tiled or overlaid. To change this, right click on the graphic window, select "Axes" and "Tiled" or "overlaid"

G.3.3.6 Create a track map

It is possible to create 2 types of track map : **standard MAP** or **GPS MAP :**

Standard MAP :

Can be drawn thanks to the data logged by :
- The lateral acceleration sensor (channel : Accel_Y)
- The speed sensor (channel : Speed)

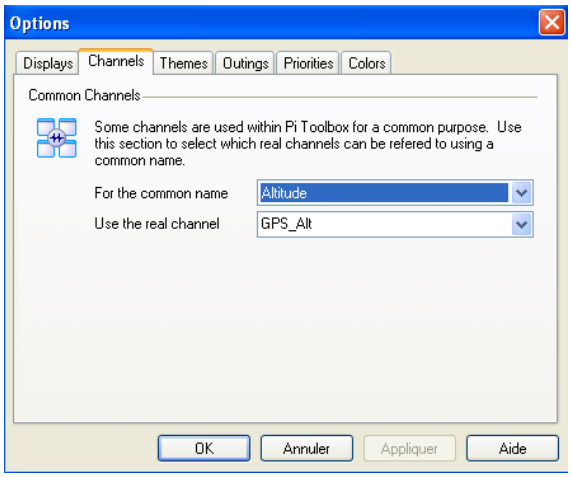
GPS MAP (possible only if the optional GPS receiver is fitted)

Can be drawn thanks to the data logged by :
- The GPS altitude (channel :GPS _Alt)
- The GPS longitude (channel :GPS _Long)
- The GPS latitude (channel :GPS _lat)

TOOLBOX CONFIGURATION:

For a correct MAP creation (standard or GPS), it's necessary to configure the channels

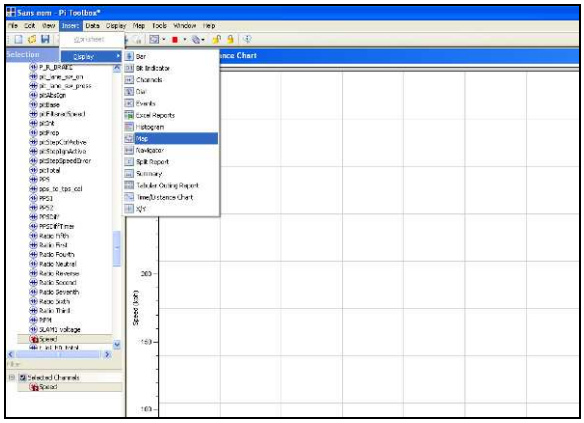
- Go to "Tools"
- Select "options"
- Click on the tag "channels"



The purpose is to attribute for each common name, the use of the real channel (logged channel in the ICD)

Common name	Real channel
Altitude	GPS_Alt
Corrected distance	Corrected distance
Corrected Speed	Corrected Speed
Distance	Distance
Fuel used	Fuel used
Global time	Global time
Heading	heading
Lap distance	Lap distance
Lateral acceleration	Accel_Y
Latitude	GPS_Lat
Longitude	GPS_Long
Map position D	Map position D
Map position X	Map position X
Map position Y	Map position Y
Map position Z	Map position Z
Speed	Speed

STANDARD MAP DRAWING :

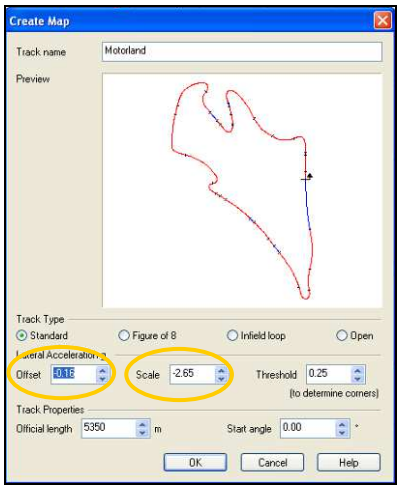


To obtain the track map window :

- Go to "Insert"
- Select "Display"
- Click on "Map"

To draw the stardard Map:

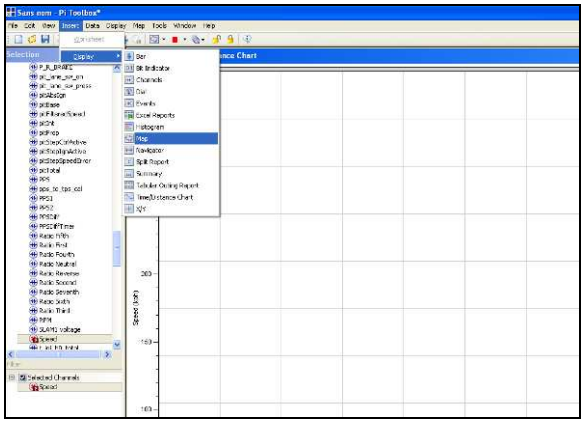
- Right click on the run (in "Tasks" window)
- select "Create Map"
- click on "standard Map"



- Use "Offset" and "Scale" to reproduce the track map.

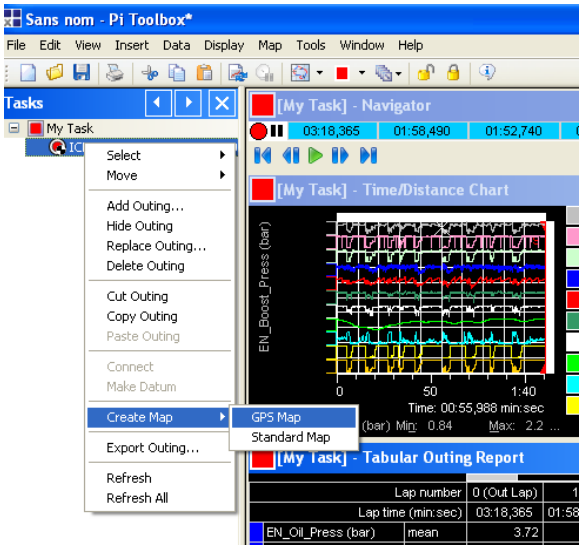
Note: to invert the track map, use a negative scale factor.

GPS MAP DRAWING :



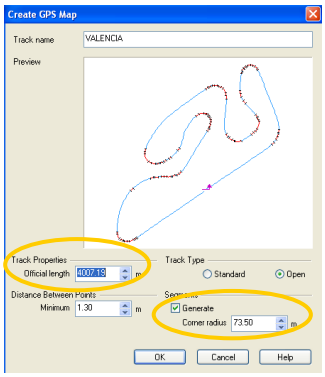
To obtain the track map window :

- Go to "Insert"
- Select "Display"
- Click on "Map"



To draw the GPS Map:

- Right click on the run (in "Tasks" window)
- select "Create Map"
- click on "GPS Map"

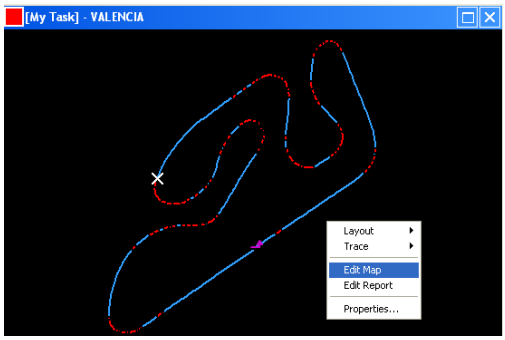


- Adjust the track official length
- Configure the corner radius

G.3.3.7 Create a xxx.qm file

The .qm file can be used in TOOLSET for qualifying mode configuration (MODE3 : Manual mode). The purpose is to create manually the segments to configure the qualifying mode as desired.
It can be very helpful for example to define the exact position of the 3 official timekeeping split if you know their positions.

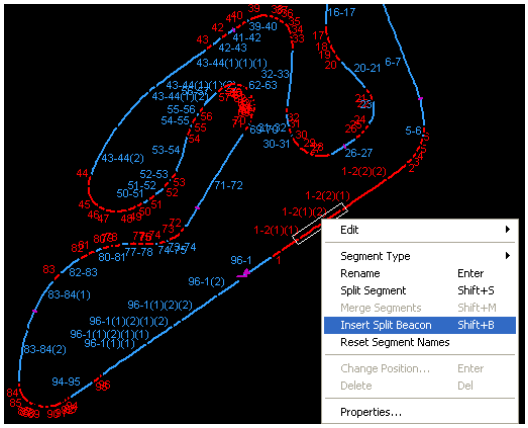
On the MAP window:
- Make a right click
- Select "edit Map"



Select a segment by clicking on the track profile and make a right click

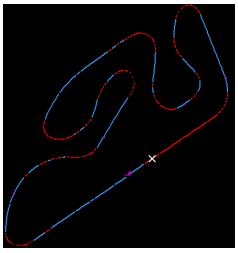
- Select "split segments" if you want to cut an existing segment, then move the "border" to the desired position using the mouse

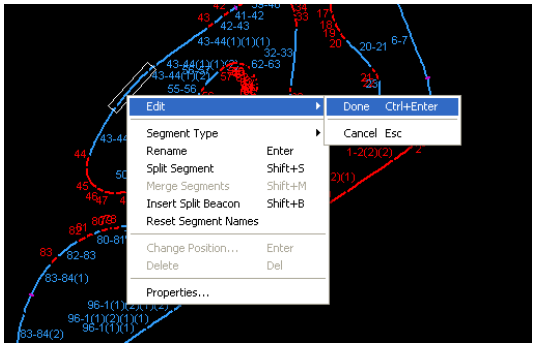
- Select "insert split beacon" if you want to insert a new beacon, then move the "beacon" to the desired position using the mouse



- When all desired beacons have been created, make a right click on the circuit. Select "Edit" and then "Done"

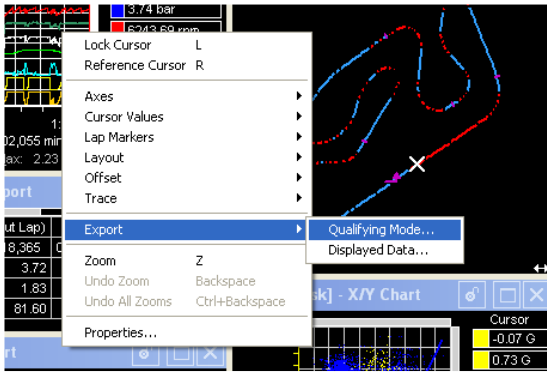
➔ the circuit becomes as below follows :





To export the Track :

Make a right click on another window (for example in a Time/distance chart) and select "qualifying mode"



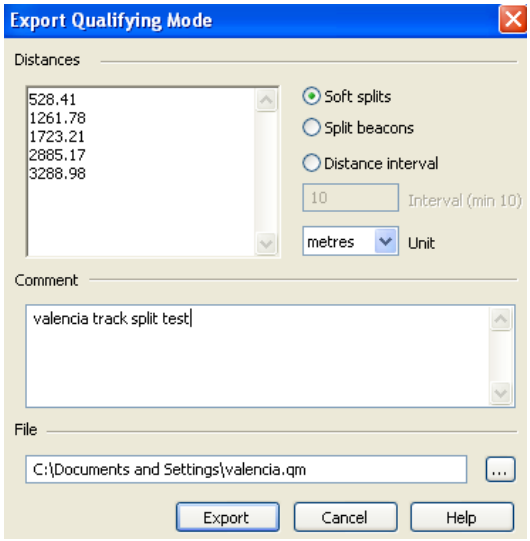
The following window appears :

Select "soft splits" to check the splits defined (in meters)

Comments can be added to find easily the file in the future

Choose a File directory to save the ***file.qm*** created

Refer to G.2.3.1 to load this track in the TOOLSET qualifying mode



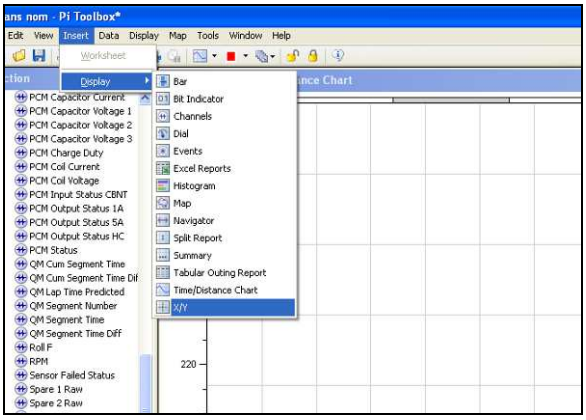
G.3.3.8 Trajectory comparison

NOTE : This function is possible only if the optional GPS receiver is fitted.

Refer to G.4.3.3 and select 2 laps to compare

Insert a X/Y chart

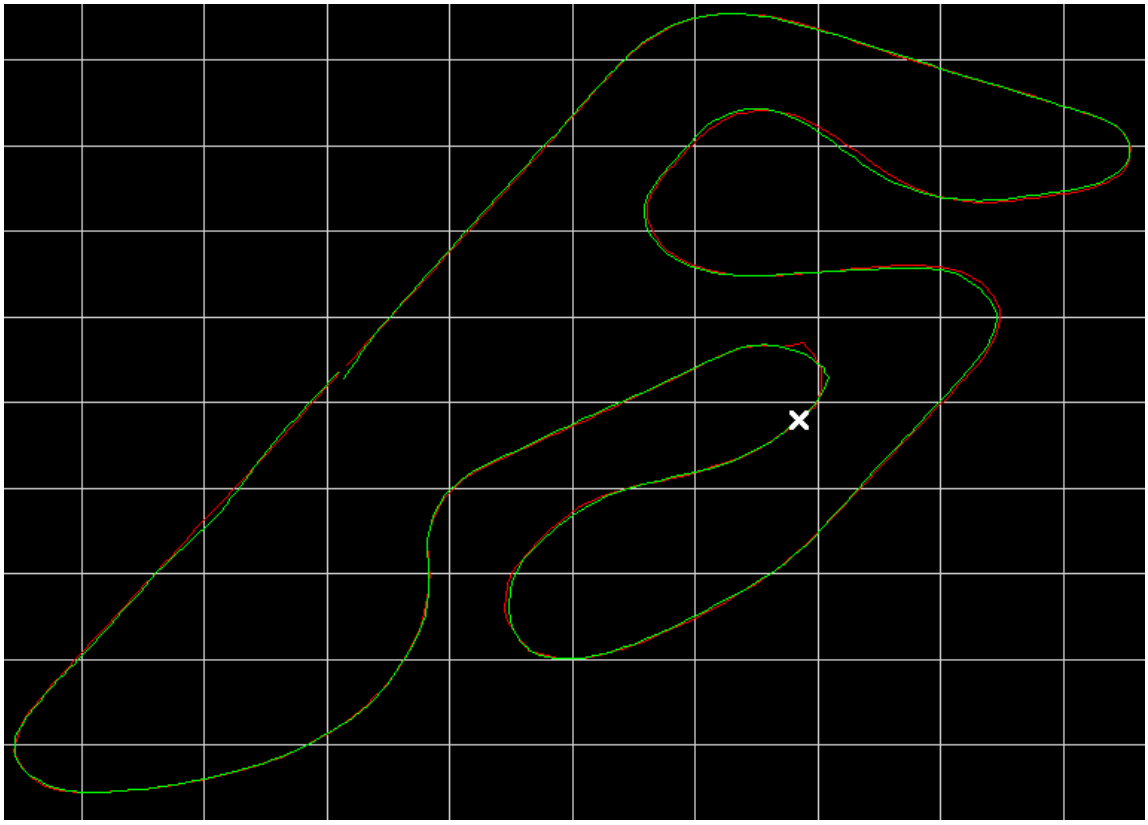
- Go to "Insert"
- "Display"
- and select a "X/Y" chart



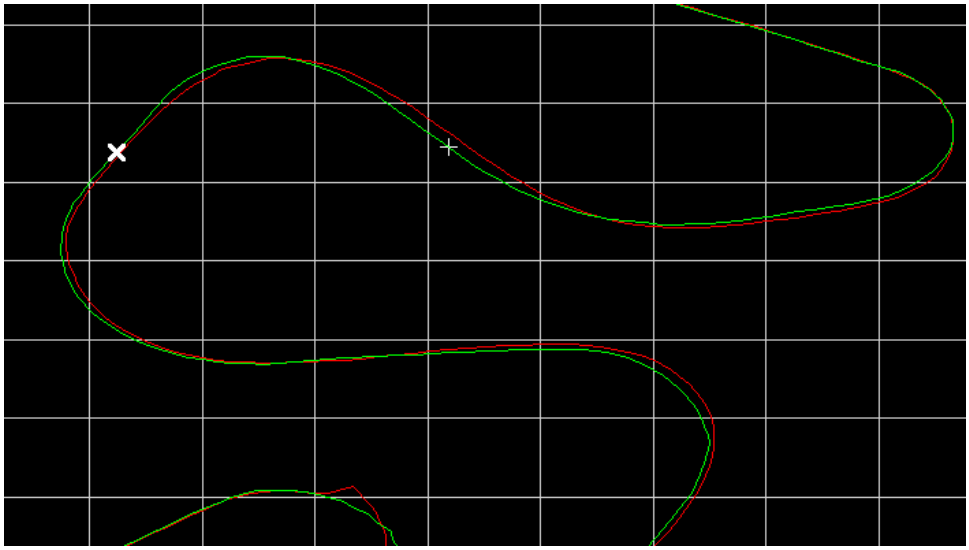
On this "X/Y" chart, insert the channels:

- GPS_Lat
- GPS_Long

The following chart appears with the 2 different trajectories compared:



By making a Zoom, you can observe the main differences between 2 drivers:



G.3.4 Shortcut keys

Shortcut	Action
Ctrl T	Add task
Ctrl L	Load outing to current task
Ctrl R	Replace outing in current task
Ctrl D	Delete outing in current task
Alt 1	Go to task manager
Alt 2	Go to channel selection manager
Alt 3	Go to channel properties manager
Alt X	Hide explorer bar
Ctrl Shift Page Up/Down	Go to previous/next lap
Ctrl Shift L	Go to lap selection menu
Ctrl Shift Home/end	Go to out/in lap
Ctrl E/Q	Display entire plot/quick lap
Ctrl O	Open a workbook
Alt Enter	Displays chart properties
-/+	Toggle Left/right scroll when zoomed
Cursor Up/down	Changes to previous/next channel
Cursor Left/Right	Go to previous/next sample
Shift Cursor Left/Right	Moves X cursor quickly
Home/End	Go to beginning/End of trace
</>	Go to previous/next event
M/N	Go to max/min value
Z/Backspace	Zoom in/out
Ctrl Backspace	Undo all zooms
H	Hide/show active trace
O	Enter/exit offset mode
R	Enter/exit reference mode
ESC	Cancels current mode
F5	Refresh
F7	Link Zoom
F8	Unlink Zoom
S	Mark a split or segment